Waste Water Treatment in Industrial and SMEs Sectors

Partners with UNIDO Phnom Penh Office

Project Locations: Phnom Penh, Kandal, and Battambang Provinces

Background and objectives

Project Background:

This project focuses on the challenge of reducing GHG emissions from waste water in the industry sector. Overall, the waste management sector in Cambodia generated 2.7Mt of CO2eq. in 2016, and emissions are forecast to increase by another 22% by 2030 (Updated NDC). The contribution of waste water to these emissions is estimated to be around 24%, but may be underestimated due to data gaps. Most waste water in Cambodia remains untreated and monitoring and enforcement have focused on larger companies, with less attention paid to SMEs. This project's innovation is focused on addressing key information gaps on waste water management challenges, GHG emissions and technology needs for industrial SMEs (mainly food and beverage), testing potential technology solutions with pilot SMEs, addressing some barriers to adoption including improved regulations / technical guidelines and monitoring capacities, and exploring potential incentive mechanisms.

Objectives:

The main objective of this project is to develop an innovative approach to reduce GHG emissions from waste water for SMEs in the food and beverage industry. The project is focused on the following outcomes:

- Improved knowledge and understanding in MISTI on GHG emissions from industrial waste water and potential technologies for SMEs to reduce these emissions
- Low carbon technology and management practices for waste water management are demonstrated
- Lessons learned from demonstrations disseminated with government and private sector decision makers
- Strengthened regulatory and financing environment for low carbon IWW management.

Approaches and technology used

Our Approaches to each company was first through the selection of 17 SMEs who have shown their interest in participated in our Project. After the final selection we were able to selected a total of 11 SMEs (10 in Battambang Province and 1 in Phnom Penh). During the training and Dissemination event, we have introduce a total of 4 different technologies to each SMEs representative such as:

- **Anaerobic treatment process**: It is a treatment through biological process where microorganism to degrade the organic contaminants in the absence of oxygen.
- **Fours – Stage Bardenpho Process**: A process that mainly focusing on nitrogen removal.
- **Oxidation Ditche**: It is modified activated sludge biological treatment process that uses long solids retention times (SRTs) to remove biodegradable organics.
- **Sludge treatment Technology**: It is a treatment using digestion typically follows these steps in series: thickening, anaerobic digestion, and dewatering before biogas monetization and biosolids reuse or disposal.

Through a series of Factory visit, we have identified that only 8 of the 11 SMEs have the capacity and available space for construct the **Anaerobic Treatment process** due to its efficiency and low maintenance low which is suitable for each selected SMEs.

Results

1. Completion of the construction work on the anaerobic treatment process in eight pilot SMEs that helped to reduce GHG emissions, to reused treated water to irrigate flowers and plants surrounding the company's premises and to safely discharge the treated water into the public sewer after it has gone through the treatment process.
2. The training and dissemination event enhanced the knowledge of each participant on the importance of Wastewater Treatment technologies that could help the company not only by reducing their water usage but also help their cost of production and improve their knowledge and understanding of the GHG inventory in the Industrial Wastewater sector as has been shown an improved score from 25% to 60% and the highest score of 90% to 97% on the questionnaires conducted after the training.
3. The new update Guideline and Regulation on Wastewater Treatment in SMEs has been developed and approved by each of the five head department from the Ministry of Industry, Science, Technology and Innovation with the plan to further develop this guideline in the foreseeable future in order to be use publicly and with the approval from the Minister.
4. Through the factory audits, factory visits and dissemination events, the Project was able to help over 220 households to have a better understanding of Wastewater Treatment and how to save water.
5. Through conducting the Green House Gas Inventory Report and Technology Need Assessment, we were able to get a better view on how each company generate their Wastewater and GHG emission into the atmosphere. Due to this, were able to effectively recommend the necessary action for each SMEs to help reduce not only the amount of GHG emission and Wastewater generation, but also help reducing the production cost as well.

Through good collaboration between the Project team and SMEs, our project team were able to conducted the data collection for the Calculations for the Potential of GHG emission Reduction as well as Wastewater Generation per year.

SME	Wastewater Generation before TNA (m^3/year)	GHG Emissions (t CO2e/year)	Wastewater Generation after TNA (m^3/year)	GHG Emissions (t CO2e/year)	Emissions Reduction Potential (t CO2e/year)
SME 1	40,296	125.93	40219	125.69	0.24
SME 2	6,000	18.75	5964	18.64	0.11
SME 3	1,872	3.16	1699	2.87	0.29
SME 4	4,500	11.53	3681	9.43	2.10
SME 5	1,572	4.91	1500	4.69	0.23
SME 6	900	0.68	816	0.61	0.06
SME 7	1,200	3.75	1110	3.47	0.28
SME 8	3,000	7.69	1950	5.00	2.69
SME 9	15,750	24.61	13050	20.39	4.22
SME 10	46,800	146.25	46728	146.03	0.22
SME 11	16,740	26.16	16072	25.11	1.04
Total	138,630	373.41	132,789	361.92	11.49

Scale up plan

After the Implementation of Project "Waste Water Treatment in Industrial and SMEs Sectors" which mainly focused on the SMEs in Food & Beverage sector. We were able to sees that majority of SMEs have limited knowledge about the impacts of GHG emission to the atmosphere and how it will effect the future generation. However, the SMEs in Food & Beverage sector production process does generate the amount of GHG as high as those in Garment and Textile sector. Furthermore, SMEs line of production is relatively small when compared to Large Enterprises. Based on this Project with 8 SMEs as our pilots, we can scale up the project plan to Large Enterprise in Food & Beverage sector as well as SMEs in Garment and Textile Sector that Generate a much higher amount of GHG emission.

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